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Montana Water Pollution Council

November 1965

REPORT

OF A

STREAM SURVEY

OF THE

ST. MARY and BELLY RIVER DRAINAGES

OF

MONTANA

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FOREWORD

The Water Pollution Council is charged by statute to classify Montana's water on the basis of their most beneficial uses and to establish water quality criteria for the control of waste discharges into the streams and lakes of the State. Of the three major river basins that originate in Montana, the Hudson Bay Drainage system has not yet been classified by the Council.

The following report substantiates the general contention that the waters of the St. Mary and Belly Rivers are very low in dissolved solids and basically quite "sterile" in nature. As a consequence, aquatic plants and animals are sparse and the recreational fishery must be supported artificially to meet the demands of the Glacier Park visitors.

Based on this report, a proposed use classification is presented. Also, a modified criteria for waste discharges as applied to the receiving stream is presented whereby a single-letter, use designation still prescribing to the multiple-use concept of Montana waters as exercised by the Water Pollution Council, is recommended.

John S. Anderson, M.D.
Executive Officer

Report to Montana Water Pollution Council, November, 1965

A STREAM SURVEY OF THE ST. MARY AND BELLY RIVER DRAINAGES OF MONTANA

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REPORT OF A STREAM SURVEY
OF THE
ST. MARY AND BELLY RIVER DRAINAGES
OF
MONTANA

Of the three major drainage systems originating in Montana, only the Hudson Bay Drainage remains to be classified as to its most beneficial water uses and corresponding water quality criteria established. The St. Mary and Belly Rivers constitute the two most significant stream systems of the Hudson Bay Drainage in Montana. The headwaters of these two rivers originate within the boundaries of Glacier National Park on the east slope of the Continental Divide. Separating these rivers from the headwaters of the Milk River, is the Hudson Bay Divide. The Lewis Range forms the geographical separation between this drainage system and the Kootenai River basin. (Figure 1 on following page)

The St. Mary River system originates near Logan Pass (Figure 1). One tributary, Divide Creek forms about five miles of the Glacier Park boundary immediately south of St. Mary. Much of the St. Mary drainage basin, both within and outside the Park, is occupied by lakes primarily the Upper and Lower St. Mary Lake. The major contributing tributary to the St. Mary drainage is Swiftcurrent Creek (and Lake Sherburne) which joins the River near Babb (Figure 1).

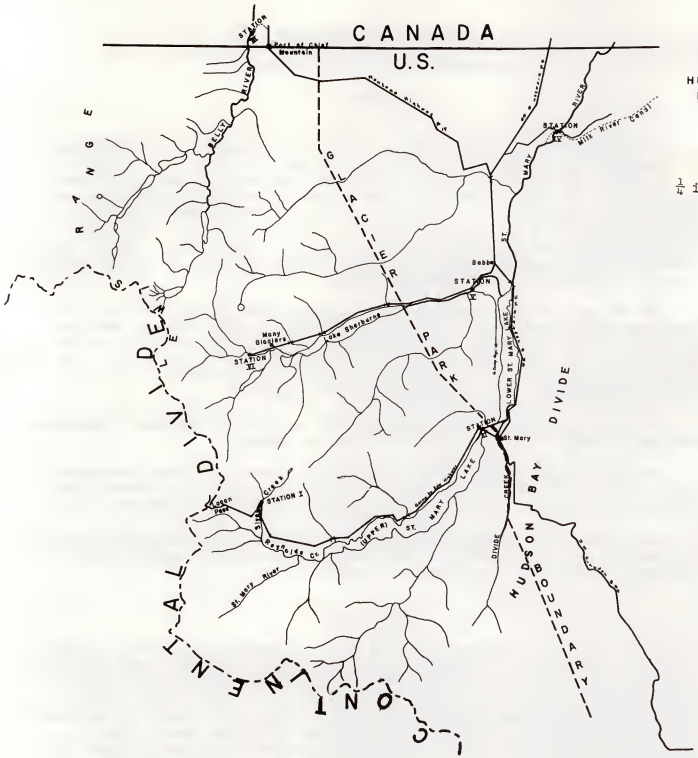
The St. Mary River leaves the Park near the community of St. Mary, flows north, and enters Alberta, Canada near Port of Piegan and Carway.

Of the three major streams studied, the Belly River is the least accessible and developed. This stream is confined to the Park and flows into Waterton Lakes Park, Alberta, Canada near Port of Chief Mountain Customs Station (Figure 1).

This survey was conducted during the period of August 2-6, 1965 and the results are used as a basis for a proposed use classification and water quality criteria of the waters of the Hudson Bay Drainage in Montana.

Water Uses

Within the Park, the only water uses involve recreation and fishing. Swimming is restricted to the lower lakes and sections of stream immediately below the lakes since glacier-fed, headwater stream temperatures appeal to none except possibly members of the 'Polar Bear' Club. A major mackinaw (lake trout) fishery exists in (upper) St. Mary Lake and a "put-'n-take" eastern brook trout fishery is maintained in Swiftcurrent Creek near Many Glacier campground during the summer season. A reportedly fair to good resident trout fishery is enjoyed by a limited number of anglers ambitious enough to hike to the relatively inaccessible Belly River. Considerable use of this stream for fishing was apparent on the Canadian side of the border at the Belly River camp near Port of Chief Mountain.


CANADA
U.S.
Boundary Mountain
Boundary Creek
Belly River
Waterton River
Waterton Lake
Waterton River Canal
Mt. Vimy
Mt. Galwey
Mt. Richards
Mt. Dungarvan
Mt. Saint Piran
Mt. Kintla
Mt. Custer
Mt. Brown
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Mt. Rockwell
Mt. Oberlin
Mt. Sinopah
Mt. Rising Wolf
Mt. Helen
Mt. Pollock
Mt. Wright
Mt. Stimson
Mt. Vaught
Mt. Carter
Mt. Cannon
Mt. Altyn
Mt. Morgan

Campground areas have been developed near St. Mary on the St. Mary River and at Many Glacier on Swiftcurrent Creek. To the best of the writer's knowledge, no drinking water supplies are taken from the surface waters of the Hudson Bay Drainage, at least within the Park.

The treated sewage effluent from the Many Glacier Chalet is discharged to Swiftcurrent Creek above Lake Sherburne.

Outside the Park on the St. Mary Drainage, agricultural use of water is added to the recreational and fishing uses mentioned above. The major development involves the diversion of irrigation water across the Hudson Bay Divide from the St. Mary River to the Milk River Drainage. The major fishery existent in the St. Mary system outside the Park involves Duck Lake which is closely policed by the Blackfoot Indian authorities.

Stream Survey

Methods:

Most analyses of samples collected were conducted in the field using the facilities of a mobile laboratory. Samples for determination of most of the chemical characteristics of the waters were returned to the State Board of Health Chemistry Laboratory in Helena for analysis. Water temperature, pH, turbidity and dissolved oxygen measurements were conducted at the sampling site while dissolved residue (total dissolved solids; TDS), iron, hardness, calcium, magnesium, sodium and potassium, carbonate and bicarbonate alkalinity, sulfate, chloride, nitrate, and fluoride determinations were completed in Helena. All analyses were conducted according to Standard Methods for the Examination of Water and Wastewater (APHA, AWWA and WPFC, 11th edition, 1960).

The Surber bottom sampling technique was utilized to collect four to five, one-square-foot samples of bottom-dwelling invertebrates (benthos) at each station, and collections were sorted, identified and enumerated in the mobile laboratory. The Millipore Filter method of coliform bacterial analyses was utilized as described by "Standard Methods" and again, samples were incubated and enumerated in the mobile laboratory.

Location of Sampling Stations:

Since access by road to the St. Mary River above (Upper) St. Mary Lake is non-existent, a major tributary stream (Siyeh Creek) was chosen as the "control" sampling site. The specific sampling point (Station I) was at the Going-to-the-Sun highway crossing about three miles from Logan Pass (Figure 1). Station II is located on the St. Mary River about one-half mile downstream from the outlet of (Upper) St. Mary Lake, again on Going-to-the-Sun highway about one and one half miles west of the Glacier Park entrance near St. Mary (Figure 1). The other station on the St. Mary River (Station IV) is located at the Milk River canal, siphon crossing of the river at Bureau of Reclamation Camp 9. Camp 9 is reached by proceeding north on U.S. 89 from Babb 4.5 miles to the junction of U.S.89 with Montana 17, thence two miles further on U.S. 89 to gravelled, country road to the right, thence 4.5 miles to the river.

Two stations were sampled on Swiftcurrent Creek. Station VI on Upper Swiftcurrent Creek is located immediately adjacent to the upper campground area about one and a half miles west of the turnoff to Many Glacier Chalet. The lower station (Station V) is immediately downstream from the Camp Napi crossing of the Creek about two miles west of Babb on the paved road from Babb to Many Glacier.

In order to reach the remaining station (Station III), it is necessary to enter Waterton Lakes Park, Alberta, Canada, proceed about five miles north on Provincial Highway No. 6 to the turnoff to the left to Belly River Campground (Figure 1). The extremely friendly attitude of cooperation extended the survey crew by the Canadian Customs officials is greatly appreciated.

Physical and Chemical Characteristics

Water flow:

The minimum, maximum and average flows of streams sampled are taken from U.S. Geological Survey records as published in 1964. In most cases, the maximum discharge occurred during the flood of 1964. Flows in cubic feet per second are as follows:

Location of Gaging Station	Min. flow of record		Max. flow prior to 1964		Max. flow of 1964	Ave. flow
	Date	Flow (cfs)	Date	Flow (cfs)	(cfs)	(cfs)
St. Mary River near Babb	1/5/53	26	7/4/02	9,300	16,500	791
St. Mary River at Canadian Border	11/29/36	16	6/5/08	40,000	21,000	700
Swiftcurrent Creek at Many Glacier	3/2/64	8.3	6/13/37	2,250	6,700	148
Swiftcurrent Creek below Lake Sherburne	(No flow when gates on dam of Lake Sherburne closed)		6/17/16	2,280	2,360	199
Belly River at Canadian Border	2/13-14/49	12	6/4/53	4,500	12,000	262

The effects of the 1964 flood are still very much in evidence especially on Swiftcurrent Creek and the lower section of the St. Mary River. Stream bottom materials are very loose and bed-load transport is quite excessive particularly in the river, which in turn limits the development of fish food organisms as demonstrated later in this report.

Dissolved Oxygen:

The concentration of dissolved oxygen (Table 1) was measured at each sampling site using the Alsterberg Modification of The Winkler Method (Standard Methods). Water temperature was recorded at the time of sampling and the saturation of dissolved oxygen computed using correction factors based on altitudes of sampling stations taken from a topographic map obtained from Glacier Park Ranger authorities. Correction factors for altitudes were obtained from Limnological Methods (Welch, 1948).

Dissolved oxygen at all stations was near saturation except below lakes where it was supersaturated (Table 1). This was a result of photosynthesis by algae and plankton which were abundant at the time of the study.

pH:

Hydrogen ion concentration was also determined at the sampling site using a colorimetric method.

All pH's were alkaline and ranged from 7.3 - 7.8 (Table 1).

Alkalinity:

Bicarbonate alkalinities were surprisingly high ranging from 79 ppm (as HCO_3) in Upper Swiftcurrent Creek to 131 in the Belly River. These higher-than-expected alkalinities are probably a result of the influence of high biological activity on the bicarbonate cycle. The pH was much too low for the existence of carbonate alkalinity (Table 1).

Hardness:

As expected, since the waters of Glacier Park are to a great extent of glacial origin, the water is quite "soft." Hardness ranged from 55 to 90 ppm (as $CaCO_3$) and correspondingly, calcium and magnesium are low (Ca, 14-22 ppm; Mg, 4-10 ppm). The U. S. Geological "Standards of Water Hardness" define waters ranging from 0-90 ppm hardness (as $CaCO_3$) as relatively soft and such waters are unlikely to form scale when used for boiler water.

Sodium and Potassium:

The test for sodium and potassium, used by the State Board of Health Chemistry Laboratory does not differentiate between the two chemicals and these materials are reported together.

Sodium and potassium ranged from none detectable in the St. Mary River near St. Mary to 15 ppm in the Belly River (Table 1). These quantities are far below any concentrations reported to adversely affect most water uses (Water Quality Criteria, California Water Quality Control Board, 1963).

TABLE I

Some Physical and Chemical Characteristics of Streams of the St. Mary's and Belly River Drainages, Montana, August 4-6, 1965

	Date	Time	Water Temp. °F	Dissolved Oxygen ppm	Dissolved Oxygen %Sat	pH	TDS ppm	Alkalinity mg/l HCO_3	Alkalinity mg/l CO_3	Hardness as $CaCO_3$	ppm Ca	ppm Mg	ppm Na & K	ppm SO_4	ppm Cl	ppm NO_3	ppm F	ppm Fe
Siyeh Creek	8-4-65	10:30a.m.	46	10.6	109	7.3	82	95	0	70	18	6	6	2	3	0	0	0.14
St. Marys River near St. Mary	8-4-65	3 p.m.	61	10.5	125	7.3	82	92	0	85	22	7	0	5	2	0	0	0.34
St. Marys R. at Milk R. canal crossing	8-5-65	12 noon	68	8.2	104	7.8	98	116	0	90	20	10	5	3	2	0	0	0.10
Swiftcurrent Cr. at Many Glaciers	8-5-65	2:30p.m.	48	9.7	100	7.3	76	79	0	55	16	4	8	6	2	0	0	0.10
Swiftcurrent Cr. at Camp Napi crossing	8-5-65	4:30p.m.	60	10.2	122	7.6	84	98	0	65	14	7	10	3	2	0	0	0.20
Belly River near Port of Chief Mtn.	8-6-65	10:30a.m.	54	9.3	101	7.3	115	131	0	85	22	7	15	4	2	0	0	0.24

Sulphates and Chlorides:

Again, sulphates and chlorides were very low (Table 1) and no adverse effect on any uses of Glacier Park waters can be expected.

Nitrates and Fluorides:

No nitrate or fluoride could be detected in any of the water samples collected.

Iron:

Probably the most surprising and significant chemical detected was iron. Iron was present in all water samples including Siyeh Creek near Logan Pass with concentrations ranging from 0.1 to 0.34 ppm (Table 1) with the highest quantity found in the Belly River. The higher concentrations are near the recommended Public Health Service Drinking Water Standards of 0.3 ppm. In this relatively soft and unbuffered water, some water uses may be adversely affected at times, especially if the pH should decrease below 7.0 producing ferrous iron.

These concentrations of iron may play as large a role in limiting the production of fish in Glacier Park waters as does the basic infertility of the drainage system. Minkina (1946), is reported by the California Water Quality Criteria (1963) as stating that the lethality threshold of iron to fish is 0.2 ppm.

Microbiological Characteristics

Coliform bacteria:

Membrane filter coliform bacteria were very low, ranging from none detected in Siyeh Creek to a maximum of 10 per 100 milliliters of Belly River water. Total membrane filter bacteria, or those micro-organisms in water which can grow under the culture methods used with the membrane filtering technique, were also very low. (Table 2)

"Standard Methods" defines membrane filter coliforms as "...all organisms that produce a dark (purplish-green) colony with a metallic sheen in ±two hours of incubation..." Further, it is stated, "The coliform group as thus defined is not identical with, but is believed to be roughly equivalent in sanitary significance to, the 'coliform group' ...defined (as) ...all ...aerobic and facultative anaerobic, gram-negative, nonspore-forming, rodshaped bacteria which ferment lactose with gas formation within 48 hours at 35°C." Thus, it appears that membrane filter coliforms per 100 ml of water can be used as a substitute for most probable number coliform organisms, utilized as a criterion of water quality by the Montana Water Pollution Council.

The coliform content of water of the Hudson Bay Drainage in Montana is well within the limits (50 per 100ml) established by the Council for use as a drinking water supply without treatment except for simple disinfection.

TABLE 2

Millipore Filter Coliforms in Water Samples from Streams of the St. Mary and Belly River Drainages, Montana, August 4-6, 1965

Station	Date	Time	MF coliforms per 100 ml	Total bacteria per 100 ml
Siyeh Creek	8-4-65	10:30 a.m.	0	6
St. Mary River near St. Mary	8-4-65	3 p.m.	1	200
St. Mary River at Milk River canal crossing	8-5-65	12 noon	7	50
Swiftcurrent Creek at Many Glacier	8-5-65	2:30 p.m.	5	50
Swiftcurrent Creek at Camp Napi crossing	8-5-65	4:30 p.m.	4	100
Belly River near Port of Chief Mtn.	8-6-65	10:30 a.m.	10	10

Stream-bottom-dwelling invertebrates:

Samples of benthic organisms suitable for analysis were collected at all stations except the St. Mary River at the Milk River canal siphon crossing. A flash flood had very recently scoured this section of river already heavily damaged by the flood of 1964. Only three aquatic insects were collected in five, one-square-foot samples at this station (Table 3).

The very sterile character of these waters is reflected in the low numbers of microinvertebrates per square foot of stream bottom (average, about 18 organisms per square foot). As a comparison, more productive streams, such as the Clark Fork River near Superior, Montana, produce an average of over 200 organisms/ft.^{2} with an occasional sample ranging over 2300/ft.^{2}.

Concerning the percentage of bottom organisms in the samples which are very intolerant of poor water quality, samples from below (Upper) St. Mary and Sherburne Lakes demonstrated a much lower than expected proportion of intolerant fauna (Table 3). The percentage of sensitive forms in a normal, clean-water stream is generally above 65 and averages about 80. Sixty-five per cent of the sample from below (Upper) St. Mary Lake and 55 per cent of that from Swiftcurrent Creek below Sherburne Lake were composed of organisms more tolerant of degraded environmental conditions. This may be a result of the rapid increase in stream temperatures resulting from impoundment which may be lethal to the more psychrophilic organisms expected in glacial waters. The higher percentages of intolerant forms were found in the colder water temperature streams. Figure 2 graphically illustrates the apparent relationship between the percentage of the more sensitive organisms in the bottom samples and water temperature.

TABLE 3

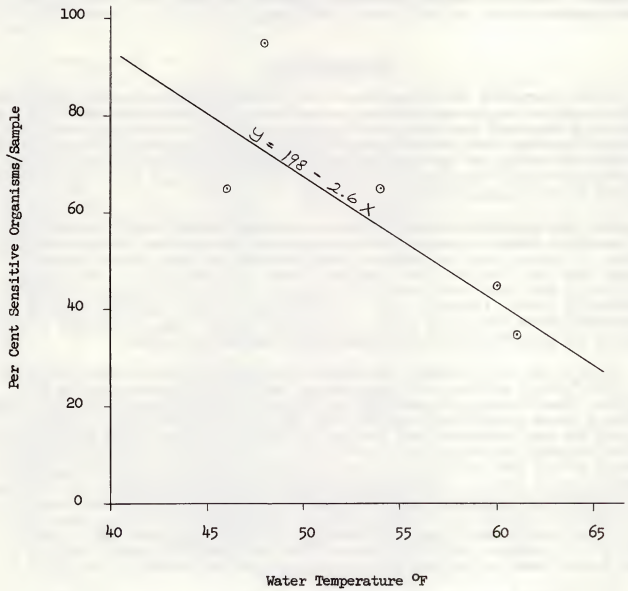
Benthic Organisms Collected from Streams of the
St. Mary's and Belly River Drainages, Montana, August 4-6, 1965

Station	Date	No. ft.^{2} taken	Total number taken					Total sensitive	% sensitive	No. per ft.^{2}
			Ephem.	Plec.	Tric.	Dip.	Total			
Siyeh Creek	8-4-65	5	115	5	5	77	202	125	62	40.4
St. Marys River near St. Mary	8-4-65	4	9	41	-	92*	142	50	35	35.5
St. Marys River at Milk River canal crossing	8-5-65	5	-	1	1	1	3**	-	-	<1
Swiftcurrent Cr. near Many Glaciers	8-5-65	4	53	13	1	4	75	71	95	18.8
Swiftcurrent Cr. at Camp Napi crossing	8-5-65	5	9	3	2	17	31	14	45	6.2
Belly River near Port of Chief Mtn.	8-6-65	5	22	6***	2	6	46	30	65	9.2

* all Simulidae
** just after cloudburst swept stream
*** five large Plecoptera

FIGURE 2

Percentage of Pollution Intolerant (Sensitive) Organisms in St. Mary and Belly River Drainage Samples Versus Water Temperature, August 4-6, 1965



Conclusions

The waters of the St. Mary and Belly Rivers in Montana are very low in total dissolved solids and are quite soft. However, the relatively high concentrations of natural iron could present a problem with regards to drinking-water use.

Microbiologically, these waters are of excellent character, however, high temperatures resulting from impoundment degrade water quality below the lakes and reservoirs. This is probably a seasonal phenomenon, however, with little if any damage apparent during the fall, winter and spring.

Recommendations

It is recommended that the waters of the Hudson Bay Drainage within Montana be held suitable for the present fishing, recreational and agricultural uses. In addition, it is suggested that these waters be held suitable for potential use as a source of drinking water requiring simple disinfection only, except the portion of Divide Creek forming the Park boundary near St. Mary, Swiftcurrent Creek below the Many Glacier sewage treatment system effluent, and the St. Mary River from the Park boundary to the Canadian border.

The close proximity of Divide Creek to developed camping areas and Park facilities with no lakes or reservoirs affording protection suggests a lower classification. Of course, with Swiftcurrent Creek receiving the Many Glacier treated sewage, this water should be more completely treated before use as drinking water. With the St. Mary River being used as a source of irrigation water and receiving considerable return irrigation flow, it is further suggested that this water be completely treated before use as a drinking-water supply. Table 4 presents the proposed use classification for the Hudson Bay Drainage in Montana.

Since it has been generally understood among Water Pollution Council members but never formally adopted, it is recommended that the single-letter system of water use classification be considered for adoption at this hearing. By this system, a Class A stream would be held suitable for use as a source of water for drinking, culinary and food processing uses without treatment other than simple disinfection; bathing, swimming and recreational water; water suitable for the growth and propagation of fish and other aquatic life; and water suitable for agricultural and industrial water supply. A Class B water would then be water suitable for drinking, culinary and food processing uses with complete treatment, plus all other uses listed under Class A above. Class C water use would drop off drinking water uses but retain recreational, fishing, agricultural and industrial uses while Class D would be held suitable for fishing, agricultural and industrial uses. Finally, a Class E water would be held suitable for agricultural and industrial uses only.

It is further suggested that a statement be added to the present criteria to the effect that a use classification would include all lower class uses. (Table 5).

November 2, 1965

MONTANA STATE BOARD OF HEALTH
Division of Environmental Sanitation

Table 4. Adopted Classification of Water Uses of the St. Mary and Belly Rivers, Hudson Bay Drainage, Montana.

BODY OF WATER Order[1] Fourth	Fifth	LOCATION	PRESENT USE	ADOPTED CLASSIFICATION
Belly River and	All Tributaries	From its source to U.S.-Canadian Border	F&R[2]	A[4]
St. Mary R. and	All Tributaries within the Park except that portion of Divide Creek which forms the Park boundary and Swiftcurrent Creek below Many Glacier Chalet	From source to Park boundary near St. Mary	F&R	A
	That portion of Divide Creek forming Park boundary to its confluence with St. Mary River	Approximately the lower five miles of stream	F&R;Ag[3]	B[5]
	Swiftcurrent Creek and Tributaries	From source to Many Glacier Chalet	F&R	A
	Swiftcurrent Creek	From Many Glacier Chalet to confluence with Lower St. Mary Lake	F&R	B
	All other tributaries to Swiftcurrent Creek within the Park		F&R	A
St. Mary River	And Tributaries	From Park Boundary to U. S. Canadian border	F&R;Ag	B
Waterton River	And Tributaries in Park	From Origin to Boundary	F & R	A

[1]a first order stream is one which terminates at the ocean; 2nd order are tributary to 1st, etc.
[2]F&R = fishing and recreation
[3]Ag = agricultural uses
[4]A = A, C, D & E uses
[5]B = B, C, D & E uses

Table 5

STATE OF MONTANA WATER POLLUTION COUNCIL

STREAM CRITERIA FOR WASTE DISCHARGES

WATER QUALITY OBJECTIVES AND MINIMUM TREATMENT REQUIREMENTS FOR MONTANA SURFACE AND UNDERGROUND WATERS

WATER QUALITY WATER USES	*ORGANISMS OF THE* COLIFORM GROUP	*FLOATING, SUSPENDED* SETTLEABLE SOLIDS AND SLUDGE DEPOSITS	*TASTE OR ODOR* PRODUCING SUBSTANCES	*DISSOLVED* OXYGEN	*pH*	*TOXIC, COLORED, OR* OTHER DELETERIOUS SUBSTANCES	*PHENOLIC* COMPOUNDS	OIL	*HIGH TEMPERATURE* WASTES	*MINIMUM TREATMENT* REQUIREMENTS FOR DOMESTIC SEWAGE
(A) WATER SUPPLY, DRINKING, CULINARY, AND FOOD PROCESSING. Without treatment other than simple disinfection and removal of naturally present impurities.	Most probable number (MPN) coliform bacterial content of a representative number of samples should average less than 50 per 100 ml. in any month.	None attributable to sewage, industrial wastes, or other wastes which, after reasonable dilution and mixture with receiving waters, interfere with the best use of these waters for the purpose indicated.	None attributable to sewage, industrial wastes or other wastes.	Greater than five (5) parts per million, except for underground waters.	Hydrogen ion concentration expressed as pH should be maintained between 6.5 and 8.5	None alone or in combination with other substances or wastes in sufficient amounts or of such nature as to make receiving water unsafe or unsuitable for use indicated (U. S. P. H. S. Stds)	Less than five (5) part per billion	None	Not in sufficient quantities alone or in combination with other wastes to interfere with the use indicated.	Primary treatment and effective disinfection except in special cases as determined by the State Board of Health. Sewage lagoon treatment will meet this requirement.
(B) WATER SUPPLY, DRINKING, CULINARY, AND FOOD PROCESSING. With treatment equal to coagulation, sedimentation, filtration, disinfection, and any additional treatment necessary for removing naturally present impurities	MPN coliform bacterial content of a representative number of samples should average less than 2000 per 100 ml. and should not exceed this number in more than 20 percent of samples examined in any month where associated with domestic sewage.	(Same as for use "A" above).	None attributable to sewage, industrial wastes or other wastes which, after reasonable dilution and mixture, will increase the threshold odor number above eight (8).	Same as for use "A" above.	Same as for use "A" above.	Same as for use "A" above.	Same as for use "A" above.	None detectable	Same as for use "A" above.	Same as for use "A" above.
(C) BATHING, SWIMMING, AND RECREATION. Note: When waters are used for recreational purposes such as fishing and boating, exclusive of bathing and swimming, the number "1000" may be substituted for "240" in statement of coliform objectives.	MPN coliform bacterial content of a representative number of samples should average less than 240 per 100 ml. and should not exceed this number in more than 20 percent of samples examined in any month where associated with domestic sewage.	Same as for use "A" above.	None attributable to sewage, industrial wastes or other wastes which, after reasonable dilution and mixture, will interfere with the best use of these waters for the purpose indicated.	Greater than five (5) parts per million.	Same as for use "A" above.	Same as for use "A" above.	Less than twenty five (25) parts per billion or none in sufficient amounts as to impart a residual taste to recreational or commercial fish or other aquatic forms	Same as for use "B" above.	Same as for use "A" above.	Same as for use "A" above.
(D) GROWTH AND PROPAGATION OF FISH AND OTHER AQUATIC LIFE. Including waterfowl, furbearers, and other aquatic and semi-aquatic life.	See note under "C" above.	Same as for use "A" above.	None attributable to sewage, industrial wastes or other wastes which will interfere with the palatability or propagation of recreational or commercial fish or other edible aquatic forms.	Same as for use "C" above.	Same as for use "A" above.	None alone or in combination with other substances or wastes in sufficient amount or of such character as to make receiving waters unsafe or unsuitable for use indicated.	Same as for use "C" above.	Same as for use "B" above	Not in sufficient quantity as to increase the temperature of the receiving water beyond that optimum for the normal aquatic life of the specific water.	Primary treatment and effective disinfection. Sewage lagoon treatment will meet this requirement.
(E) AGRICULTURAL AND INDUSTRIAL WATER SUPPLY Without treatment except for the removal of natural impurities to meet special quality requirements other than those classified under "A" above. Note: Permissible limits for total concentration percent sodium, boron, chlorides, and sulphates to receive further study, suggested value for percent sodium is less than 60, Percent sodium computed as the ratio of sodium to total cations expressed in equivalent weights. Calculated from the formula: Na X 100 ÷ Na + K + Ca + Mg when Na, Ca, K, and Mg are expressed in equivalents.		Same as for use "A" above	None attributable to sewage, industrial wastes or other wastes which will adversely affect the marketability of agricultural or industrial produce.	Greater than three (3) parts per million.	Hydrogen ion concentration expressed as pH should be maintained between 6.0 and 9.5	Same as for use "A" above.	None in sufficient quantity as to make receiving water unsuitable for use indicated.	Same as for use "B" above	Same as for use "A" above.	Same as for use "D" above.

Water Quality Objectives of a watercourse will apply at the point of discharge of a waste except in special cases where the sampling points will be determined by the Montana Water Pollution Council.

Determinations in the above table will be in accordance with "Standard Methods for the Examination of Water, Sewage and Industrial Wastes".

Adopted tentatively Feb. 28, 1956
Revised April, 1958
Reviewed Sept. 2, 1958

Water use classifications of any class include all water uses of a lower classification (A= A,B,C,D,E; B= B,C,D,E; etc.)